

### **ABSTRACT OF THE DISCLOSURE**

A composite proton exchange membrane and method of manufacturing the same. The composite proton exchange membrane comprises a proton exchange membrane which has been modified by replacing membrane protons in desired areas of the membrane with a cationic polymer. The cationic polymer is preferably formed by introducing a quaternary salt monomer into the membrane and then effecting the polymerization of the monomer. The modified areas of the proton exchange membrane exhibit increased strength, reduced water and gas permeability, reduced proton conductivity and reduced acidity. Accordingly, by modifying the periphery of the membrane, one can obtain an integral sealing edge for the membrane, and by modifying certain interior regions of the membrane, one can divide the membrane into a plurality of sealed segments.